
The Intelligence Gap

Untapped Value in Equipment Manufacturing:
From Documentation to Customer Experience

A landscape overview of the problems, opportunities, and emerging
AI applications across the manufacturing value chain

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March 2026

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1. Executive Summary

Equipment manufacturers sit on an extraordinary, largely untapped asset: the knowledge embedded in their technical documentation, service history, connected telemetry, and dealer networks. Today, that knowledge is fragmented across PDFs, legacy databases, disconnected IoT dashboards, and the heads of retiring technicians.

The result is a value chain full of friction. Technicians spend more than half their day searching for information instead of fixing equipment. Dealers lack the tools to deliver premium service experiences. Owners of complex, high-value equipment get PDF manuals and phone numbers. And OEMs ship connected products that generate data nobody acts on.

This paper maps the full landscape: where value is being lost at each handoff point in the equipment manufacturing ecosystem, where new value can be created, and what AI-powered intelligence applications look like in practice today. It draws on data from McKinsey, Deloitte, BCG, IFS, the Manufacturing Institute, and industry-specific research across marine, powersports, automotive, agricultural, and industrial equipment sectors.

The core thesis is simple: the companies that figure out how to connect documentation, telemetry, and service operations into a single intelligence layer will capture the largest share of aftermarket value in the next decade. And the window to build that advantage is open now.

25%

EBIT margin on aftermarket services

McKinsey (30-industry analysis)

1.9M

manufacturing jobs unfilled by 2033

Deloitte / Manufacturing Institute, 2024

\$141B

IoT in manufacturing market (2025)

Fortune Business Insights

2. The Landscape: A Value Chain Under Pressure

The equipment manufacturing value chain runs from the OEM through dealers and service providers to the end customer. At each handoff point, knowledge is lost, context is dropped, and value leaks out of the system.

The OEM Documentation Investment

Equipment manufacturers invest millions in creating technical documentation: owner's manuals, service manuals, parts catalogs, technical service bulletins, wiring diagrams, and training materials. For a complex product like a marine outboard engine or an industrial compressor, the documentation library can run to thousands of pages across dozens of documents.

Yet this documentation is overwhelmingly distributed as static PDFs or printed manuals. It is not searchable in context. It is not connected to the specific equipment a technician is working on. It is not linked to live telemetry that might indicate which procedure is relevant right now. The knowledge exists, but accessing it requires knowing where to look, what to search for, and how to interpret what you find.

A 2025 manufacturing survey found that 72% of companies have 'hidden factories' of undocumented fixes and workarounds that mask the true extent of maintenance issues. Only 55% of businesses have established formal systems for documenting and sharing maintenance knowledge between technicians, according to McKinsey research. The documentation exists, but the systems to make it useful do not.

The Dealer Caught in the Middle

Independent dealers are the primary customer relationship for most equipment manufacturers. They sell the product, service it, sell parts, and handle the post-sale experience. They are also chronically under-equipped for this role.

Most dealers operate with a patchwork of vendor-licensed software: a Dealer Management System (DMS) from CDK, Lightspeed, or DealerSocket for customer records and scheduling; a separate parts ordering system; a separate accounting package; and whatever service documentation the OEM provides. These systems rarely talk to each other. The global automotive DMS market alone is valued at \$4.96 billion (2024), projected to reach \$11.67 billion by 2034, growing at 8.9% CAGR. The investment is massive, but the intelligence layer connecting these systems is almost entirely absent.

Meanwhile, customer expectations are rising. Studies indicate 68% of consumers now prefer digital service scheduling. In automotive, customer satisfaction reached an all-time high in 2024 when dealers invested in omnichannel experiences. Marine, powersports, and industrial equipment dealers face the same expectations but with a fraction of the digital infrastructure available to automotive retailers.

The Technician Crisis

The skilled technician shortage is not coming; it is here. The manufacturing sector will need 3.8 million new employees between 2024 and 2033, but 1.9 million of those jobs could remain unfilled, representing a 50% fulfillment gap (Deloitte / Manufacturing Institute, 2024). Nearly one-third of manufacturing workers are over 55. The Service Council estimates the global field service industry could lose up to 40% of its 20 million personnel to retirement within the next three to four years.

When experienced technicians retire, they take decades of diagnostic intuition with them. This institutional knowledge is rarely documented, highly contextual, and impossible to replace through standard training programs. The result is a compounding problem: fewer technicians, less experienced, with worse tools to find information.

61%

of a technician's day spent searching

IFS / Reliabilityweb

25-35%

average 'wrench time' in most orgs

Fiix Software / industry benchmark

40%

of field service workforce at retirement risk

Service Council

The impact is direct: technicians in most organizations spend only 25-35% of their day with tools in hand, performing actual maintenance work. IFS research found that technicians spend over 60% of their day searching systems for tools, parts, and information, plus completing administrative paperwork. A lack of job-enabling technology was cited as a top challenge by 38% of skilled trade workers, alongside a lack of knowledge sharing and collaboration on the jobsite (31%).

The Owner Expecting More

The end customer, whether they own a \$350,000 fishing boat, a fleet of commercial vehicles, or industrial processing equipment, expects the service experience to match the sophistication of the product they purchased. Instead, they get a PDF manual they will never open, a phone number for their dealer, and a vague service schedule.

This is a massive missed opportunity. Every unanswered owner question is a service appointment that did not get scheduled, a part that did not get ordered, a warranty issue that went unresolved. The owner is the revenue engine of the aftermarket. Engaging them with intelligent, contextual, easy-to-use tools turns passive ownership into active service revenue for the dealer network.

3. Connected Equipment, Disconnected Value

The IoT revolution in manufacturing is real by any measure. The global IoT in manufacturing market was valued at \$141.18 billion in 2025 and is projected to reach \$1.1 trillion by 2034, growing at 26.2% CAGR (Fortune Business Insights). An estimated 40 billion IoT devices will be in operation by 2030. In marine alone, connected equipment platforms like Siren Marine, Yacht Sentinel, and OEM-specific telematics are becoming standard on new vessels.

Yet the data these systems generate overwhelmingly flows into dashboards that nobody checks, or generates alerts that lack the context needed to act on them. A temperature reading means nothing without the documentation that explains what temperature range is normal for that engine under those conditions. A high engine-hours count means nothing without the service schedule that specifies what maintenance is due. Telemetry without documentation context is just noise.

Research confirms this gap. 75% of IoT projects fail to achieve their desired outcomes, often due to poor integration or mismatched technology strategies. The missing layer is not more sensors or better dashboards. It is the intelligence that connects telemetry to documentation to service operations, converting raw data into contextual, actionable information delivered to the right person at the right time.

This is the intelligence gap: the space between what a manufacturer knows (documentation + telemetry) and what the ecosystem can access (fragmented PDFs, disconnected dashboards, and the phone number of a busy dealer).

4. The Aftermarket Opportunity

Shifting to Service-Based Revenue

The strategic case for aftermarket services is no longer debatable. A McKinsey analysis across 30 industries found that average EBIT margin for aftermarket services was 25%, compared to just 10% for new equipment sales. BCG reports that service revenue among industrial manufacturers grew 10% in 2023, with an expected further 8% increase in 2024. Services carry gross margins that are roughly double the 15-25% typically earned from equipment sales.

PMMI's 2025 Aftermarket Parts and Service report found that over the next three years, 96% of OEMs surveyed expect growth in parts sales and 94% expect growth in services. Deloitte research shows that manufacturers focused on services often have 80% or more of their installed base under service contracts, creating recurring revenue streams that stabilize the business through economic cycles.

The opportunity is clear, but capturing it requires a fundamental shift in how OEMs engage with their installed base after the initial sale. It requires knowing what equipment is in the field, what condition it is in, what service it needs, and which dealer is best positioned to deliver that service. This is a knowledge problem.

Adjacent Industries Leading the Way

Automotive is the most instructive adjacent example. Automotive OEMs and their dealer networks have invested billions in connected vehicle platforms, digital service scheduling, parts inventory optimization, and customer retention systems. The automotive DMS market (\$4.96B in 2024) is a mature ecosystem of interconnected tools that manage the customer lifecycle from sale through service.

Marine, powersports, agricultural, and industrial equipment manufacturers are 5-10 years behind automotive in this transformation, but their customers expect the same experience. The marine maintenance software market alone is projected to grow from \$1.28 billion in 2025 to \$2.13 billion by 2032. This is a market in early-stage acceleration, and the manufacturers and technology partners who establish platform positions now will be difficult to displace.

Heavy equipment manufacturers like Caterpillar and John Deere have led the way in fleet telematics and predictive maintenance. One of the largest equipment dealers plans to have most or all of its equipment sold across multiple continents connected to manufacturer cloud services (Deloitte). The pattern is consistent: connect the equipment, then connect the intelligence.

5. Where AI Creates Real Value Today

Generative AI and retrieval-augmented generation (RAG) have moved from research novelty to production capability. For equipment manufacturing, the practical applications fall into four categories that map directly to the value chain gaps identified above.

Documentation Intelligence

The foundational application: ingest a manufacturer's entire documentation library (service manuals, parts catalogs, technical bulletins, wiring diagrams) and make it queryable in natural language. A technician asks 'What oil does the F300 require?' and gets the specific oil type, viscosity, capacity, change interval, filter part number, and a diagram of the lubrication system, all with citations back to the source document and page number.

This is not a chatbot. It is a structured retrieval system that returns safety warnings, spec tables, step-by-step procedures, and parts lists, rendered in a format appropriate for the user (dense and procedural for a technician, conversational and action-oriented for an owner). The AI layer handles the complexity of understanding the question and finding the right information; the output is structured, verifiable, and citation-backed.

Predictive Service Operations

When documentation intelligence is connected to live equipment telemetry, the system transitions from reactive to predictive. If a vessel has 847 engine hours and the service manual specifies a 1,000-hour major service, the system can proactively alert the dealer and the owner, identify which parts will be needed, check inventory availability, and pre-populate a work order. ABB's research suggests predictive maintenance reduces spare parts needs by up to 40%, and real-time monitoring alone has been shown to reduce unplanned downtime by 25%.

Customer Experience Transformation

For owners and customers, the same intelligence platform can power a completely different interface: conversational, branded to the dealer, and designed to turn every question into an action (schedule service, order parts, contact dealer). This transforms the owner experience from 'here is a PDF manual' to 'ask anything about your equipment and we will connect you to what you need.'

This is a new category of customer engagement tool that does not exist in most equipment verticals today. It creates a direct, always-available channel between the owner and the dealer network, powered by the OEM's own documentation and telemetry. Every interaction is a potential service revenue event.

Fleet-Wide Intelligence

At scale, the data flowing through a documentation intelligence platform reveals patterns invisible to individual dealers or technicians. Which failure modes are most common across a model line? Which documentation sections generate the most queries (indicating unclear instructions or common problems)? Which dealers are seeing unusual service patterns? This is the feedback loop that connects field experience back to product development, quality assurance, and documentation teams.

6. The Two Paths: Build New or Enhance Existing

Organizations evaluating AI-powered manufacturing intelligence face a strategic choice that is actually a spectrum. There are two deployment models, and most successful implementations use both.

Path A: Purpose-Built Applications

Build standalone, tailored tools for specific use cases: a service intelligence application for technicians, an owner self-service portal for the dealer network, a fleet analytics dashboard for the OEM. These applications run on the same underlying intelligence platform but present purpose-built interfaces designed for each user's specific workflow and context.

This path is faster to deploy (weeks, not months), requires no integration with existing vendor systems, and proves value before any significant commitment. A working prototype can be built from 2-3 equipment manuals in under two weeks. It is the right starting point for organizations that want to validate the concept before engaging IT or negotiating vendor API access.

Path B: Embedded Intelligence

For organizations that want AI capabilities inside their existing DMS, service tools, or customer portals, the intelligence layer can be embedded via API. This requires vendor cooperation, API access, and deeper technical integration, but it means technicians and dealers do not need to learn a new tool. The intelligence surfaces inside the systems they already use.

In practice, many manufacturers use vendor-licensed software that they cannot modify (CDK, Lightspeed, DealerSocket, etc.). Embedded intelligence is the longer-term play that follows after standalone tools have proven the value and justified the integration investment.

The key insight is that both paths run on the same platform underneath: the same documentation ingestion pipeline, the same telemetry connections, the same RAG architecture, the same citation tracking. Start with whichever path has the lowest friction. Add the other when the ROI justifies it.

7. A Framework for Getting Started

Manufacturing intelligence is not an all-or-nothing transformation. The most successful implementations follow a phased approach that proves value incrementally and builds organizational confidence before scaling.

Phase 1: Prove the Value (1-2 weeks)

Start with 2-3 equipment manuals and one use case (service operations, owner self-service, or dealer support). Build a working prototype that demonstrates documentation intelligence with your actual content. No integrations, no IT project, no vendor approvals. The goal is to see what is possible with your own data and validate whether the output quality is sufficient for your use case.

Phase 2: Pilot with Real Users (4-8 weeks)

Deploy the prototype with real technicians, dealers, or customers. Ingest the full documentation library. Connect telemetry if available. Integrate with one or two downstream systems (parts lookup, service scheduling). Measure outcomes: time to answer, parts identification accuracy, service appointment conversion, user satisfaction.

Phase 3: Scale Across the Platform (Ongoing)

Expand to multiple equipment models, multiple dealer locations, and multiple user types. Add white-labeling for the dealer network. Connect additional integration points. Begin capturing fleet-wide analytics. Transition from project to platform.

The requirements to start are minimal: 2-3 equipment manuals (PDF is fine), one use case to focus on, and one point of contact who knows the product and can validate results. Everything else builds from there.

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This document was prepared by Planara Manufacturing Intelligence. For questions, to discuss applications for your equipment line, or to schedule a prototype demonstration, contact us at planara.com.